1. A device for processing a sample comprising

a processing unit having an opening to receive a sample vessel and at least one processing station positioned along the opening, the processing station having a compression member adapted to compress the sample vessel within the opening and thereby displace a content of the sample vessel within the sample vessel.

2. The device of claim 1, wherein the processing station further comprises an energy transfer element for transferring energy to or from the content within the sample vessel and a control system coupled to the energy transfer element to control the energy transferred to or from the content.

3. The device of claim 2, further comprising an energy insulator positioned adjacent the processing station.

4. The device of claim 2, wherein the energy transfer element is at least one of an electronic heat element, a microwave source, a light source, an ultrasonic source and a cooling element.

5. The device of claim 2, wherein the energy transfer element transfers thermal energy to or from the content within the sample vessel.

6. The device of claim 2, further comprising a temperature sensor coupled to the control system.

7. The device of claim 2, wherein the processing station further comprises a heat sink.

8. The device of claim 1, wherein the processing station includes a stationary member opposing the compression member across the opening, wherein the compression member compresses the sample vessel against the stationary member within the opening.

9. The device of claim 1, further comprising a driver coupled to the compression member to selectively move the compression member and thereby compress the sample vessel within the opening.

10. The device of claim 9, wherein the driver is a motor and is coupled to the compression member by a cam.

11. The device of claim 9, wherein the driver is an electromagnetic actuating mechanism.

12. The device of claim 1, further comprising at least one sensor for detecting a signal from the content within the sample vessel.

13. The device of claim 12, further comprising an energy source for applying energy to the content within the sample vessel to generate a signal from the content.

14. The device of claim 12, further comprising an electrophoresis system comprising a pair of electrodes adapted to have a predetermined voltage difference and an electrode actuator for inserting the electrodes into the sample vessel.

15. The device of claim 1, further comprising a reagent injector cartridge actuator adapted to receive a reagent injector cartridge having at least one needle in fluid communication with a reagent reservoir, the reagent injector cartridge actuator operable to move the reagent injector cartridge to inject a quantity of reagent into the sample vessel.

16. The device of claim 1, wherein the content displaced by the compression member is the sample.

17. The device of claim 2, wherein the content displaced by the compression member is a reagent.

18. A sample vessel for holding a sample comprising

a sample containing portion for holding the sample, the sample containing portion having a wall constructed of a flexible material permitting substantial flattening of a selected segment of the sample containing portion, and

a handling portion coupled to the sample containing portion, the handling portion having a generally rigid construction to facilitate handling of the sample vessel.

19. The sample vessel of claim 18, wherein the sample containing portion of the sample vessel is a tubule.

20. The sample vessel of claim 18, further comprising at least one pressure gate disposed within the sample containing portion to divide the sample containing portion into a plurality of segments.

21. The sample vessel of claim 20, wherein at least one of the segments has a filter contained therein structured to separate selected components of a sample material from other components of the sample material.

22. The sample vessel of claim 20, wherein at least one of the segments contains a reagent.

23. The sample vessel of claim 22, wherein the reagent is at least one of an anticoagulant, a cell lyses reagent, a nucleotide, an enzyme, a DNA polymerase, a template DNA, an oligonucleotide, a primer, an antigen, an antibody, a dye, a marker, a molecular probe, a buffer, and a detection material.

24. The sample vessel of claim 20, wherein the sample containing portion includes an electrophoresis segment containing a gel for electrophoresis.

25. The sample vessel of claim 24, wherein the electrophoresis segment includes a pair of electrodes adapted to maintain a predetermined voltage difference therebetween.

26. The sample vessel of claim 20, wherein at least one of the segments contains multilayer membranes for analyzing the sample.

27. The sample vessel of claim 20, wherein at least one of the segments contains a micro-array bio-chip for analyzing the sample.

28. The sample vessel of claim 18, wherein the sample containing portion includes a self-sealing injection channel formed therein, the self sealing injection channel being normally substantially free of sample material and capable of fluid communication with the sample material in the sample containing portion.

29. The sample vessel of claim 18, further comprising an instrument for obtaining a sample coupled to the sample vessel.

30. The sample vessel of claim 18, wherein the handling portion of the sample vessel includes an opening for receiving a sample.

31. The sample vessel of claim 30, further comprising a closure for selective closing the opening, wherein the closure seats against the handling portion to close the opening.

32. The sample vessel of claim 31, further comprising an instrument for obtaining a sample coupled to the closure of the sample vessel.

33. The sample vessel of claim 18, wherein the thickness of the wall of the sample containing portion is less than or equal to 0.3mm.

34. The sample vessel of claim 18, wherein the handling portion has a wall thickness greater than a thickness of the wall of the sample containing portion.

35. The sample vessel of claim 18, wherein the handling portion includes a cylindrical sleeve sized and shaped to fit over a portion of the sample containing portion.

36. The sample vessel of claim 18, wherein the handling portion is positioned longitudinally adjacent the sample containing portion.

37. A sample vessel for holding a sample comprising

a sample containing portion having at least one pressure gate disposed within the sample containing portion to divide the sample containing portion into a plurality of segments, at least one segment of the sample containing portion having a wall constructed of a flexible material permitting substantial flattening of the segment of the sample containing portion.

38. A method of processing a sample within a sample vessel comprising

introducing the sample vessel into a device for processing the sample, and

compressing the sample vessel to move the sample within the sample vessel from a first segment to a second segment of the sample vessel.

39. The method of claim 38, further comprising

introducing a reagent to the sample within a segment of the sample vessel.

40. The method of claim 38, further comprising heating the sample in the first segment to a first temperature.

41. The method of claim 40, further comprising heating the sample to a second temperature in the second segment.

42. The method of claim 41, wherein the first temperature is effective to denature the sample and the second temperature is one at which nucleic acid annealing and nucleic acid synthesis can occur.

43. The method of claim 41, further comprising

compressing the sample vessel to move the sample within the sample vessel from the second segment to the first segment of the sample vessel, and

heating the sample to the first temperature in the first segment.

44. The method of claim 37, further comprising analyzing the sample by
detecting a signal from the sample within a segment of the sample vessel, and
analyzing the detected signal to determine a condition of the sample.

45. The method of claim 44, wherein the step of analyzing further comprises
applying an excitation energy to the sample within the segment of the sample vessel.

46. The method of claim 44, further comprising conducting electrophoresis analysis of the sample by
applying a selective voltage to the sample within a segment of the sample vessel,
detecting light emitted from the sample, and
analyzing the detected light to determine a condition of the sample.

47. The method of claim 37, further comprising
applying an excitation energy to a bio-array member contained within a segment of the sample vessel,
detecting light emitted from the bio-array member, and
analyzing the detected light to determine a condition of the sample.

48. The method of claim 37, further comprising
agitating the sample within a segment of the sample vessel.

49. The method of claim 37, wherein the sample is a nucleic acid sample.

50. A method of treating a sample within a sample vessel, the sample vessel having a plurality of segments including a segment for containing a reagent and a segment for containing the sample, the method comprising
introducing the sample vessel into a device for processing the sample within the sample vessel, and
compressing one of the segments to mix the sample with the reagent within the sample vessel.

51. The method of claim 50, further comprising introducing the reagent into a reagent segment of the sample after the step of introducing the sample vessel into the device for processing the sample.

52. A thermal cycler comprising

a processing unit having an opening to receive a sample vessel containing a sample, the processing unit having a first processing station, a second processing station, and a third processing station positioned along the opening,

the first processing station including a first compression member adapted to compress the sample vessel within the opening and a first energy transfer element for transferring energy to the sample at the first processing station,

the second processing station including a second compression member adapted to compress the sample vessel within the opening and a second energy transfer element for transferring energy to the sample at the second processing station, and

the third processing station including a third compression member adapted to compress the sample vessel within the opening and a third energy transfer element for transferring energy to the sample at the third processing station, wherein compression of the sample vessel by of one of the compression members displaces the sample within the sample vessel between the processing stations.